

REMARKS

The Final Office Action mailed on November 7, 2003, has been received and reviewed.

Claims 1-13 are currently pending and under consideration in the above-referenced application. Each of claims 1-13 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Information Disclosure Statement

Please note that an Information Disclosure Statement was filed in the above-referenced application on September 8, 2003, but that the undersigned attorney has not yet received any indication that the references cited in the Information Disclosure Statement have been considered in the above-referenced application. It is respectfully requested that the references cited in the Information Disclosure Statement of September 8, 2003, be considered and made of record in the above-referenced application and that an initialed copy of the Form PTO/SB/08 that accompanied that Information Disclosure Statement be returned to the undersigned attorney as evidence of such consideration.

Rejections Under 35 U.S.C. § 102(e)

Claims 1-13 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by the disclosure of U.S. Patent 6,110,831 to Cargo et al. (hereinafter "Cargo").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Cargo describes a semiconductor device which includes a substrate 51 with an active surface and at least one conductive line (gate 55) formed on the active surface of the substrate 51. See FIG. 2; col. 2, lines 30-37. A dielectric 61, which is formed over the active surface of substrate 51 and gate 55, may include a lower portion which comprises undoped silicon dioxide

and an upper portion which comprises doped silicon dioxide. *See* FIG. 2; col. 2, lines 38-45.

Windows 66 and 67 are formed through dielectric 61 so as to expose a source/drain region 57 of the substrate 51. As shown in FIGs. 2, 4-6, and 8 of Cargo, each window 66, 67 includes side walls that extend in continuous and uninterrupted fashion through the entire thickness of dielectric 61, including both doped and undoped portions thereof.

Independent claim 1, as amended and presented herein, recites a semiconductor device that includes a semiconductor substrate and at least one conductive line disposed upon an active surface of the semiconductor substrate. An undoped silicon dioxide cap is disposed over and in contact with the at least one conductive line. A passivation layer is located over the undoped silicon dioxide cap. At least one contact aperture is formed through the passivation layer and includes at least one sidewall that extends substantially perpendicularly relative to the semiconductor substrate. At least a portion of the at least one side wall terminates at the undoped silicon dioxide cap.

As used in independent claim 1, the term “substantially” is defined by Merriam-Webster’s Collegiate Dictionary, Tenth Edition, as: “being largely but not wholly that which is specified. M.P.E.P. § 2173.05 provides, “[t]he term ‘substantially’ is often used in conjunction with another term to describe a particular characteristic of the claimed invention. It is a broad term.” (Citation omitted). Use of the term “substantially” in patent claims is definite when one of ordinary skill in the art would understand the extent of the leeway signaled thereby. *Id.*

It is respectfully submitted that Cargo does not expressly or inherently describe that the sidewalls of windows 66, 67 are oriented “substantially perpendicularly” to substrate 51.

As used in independent claim 1, one of ordinary skill in the art would readily understand that the term “substantially perpendicularly” signals that an angle formed between a sidewall and a substrate over which the sidewall is oriented will be as close to 90° as is possible with the particular anisotropic etch processes that are employed to form the sidewall. It is also readily understood and recognized by those of ordinary skill in the art that sidewalls that are formed by use of isotropic etchants are somewhat curved and not oriented at angles which are substantially perpendicular to the substrates over which they are formed. *See, e.g.,* Wolf, S. and R.N. Tauber,

Silicon Processing for the VLSI Era, Volume 1—Process Technology, page 522, *esp.* Fig. 6(c) (1986); Van Zant, P., Microchip Fabrication, page 222 (1990).

When viewing FIGs. 2, 4-6, and 8 of Cargo, one of ordinary skill in the art would readily recognize that the sidewalls of the windows 66, 67 formed through dielectric 61 were formed by isotropic etch processes rather than anisotropic etch processes and, thus, that the sidewalls of windows 66, 67 are not oriented “substantially perpendicularly” to the substrate 51 over which dielectric 61 is disposed.

It is also respectfully submitted that Cargo lacks any express or inherent description that any of the sidewalls of windows 66, 67 includes at least a portion “terminating at an interface between [a] passivation layer and [an] undoped silicon dioxide cap.”

The term “terminate” is defined by Merriam-Webster’s Collegiate Dictionary, Tenth Edition, as: “to extend only to a limit (as a point or line); *esp.* : to reach a terminus . . .” In independent claim 1, “terminating” refers to the limit to which the at least one sidewall extends. More specifically, independent claim 1 requires that the at least one sidewall extend to an interface between a passivation layer and an undoped silicon dioxide cap.

In contrast, the sidewalls of windows 66, 67 of the structure described in Cargo do not terminate at an interface between a passivation layer and an undoped silicon dioxide cap. Rather, the sidewalls terminate at an interface between dielectric 61, which is formed from undoped silicon dioxide, and the underlying substrate 51, which is formed from a semiconductor material, such as silicon.

Each of claims 2-5 is allowable, among other reasons, for depending from claim 1, which is allowable.

Independent claim 6, as proposed to be amended herein, is drawn to a semiconductor device that includes a semiconductor substrate, at least one undoped silicon oxide structure, and at least one doped silicon oxide structure over the at least one undoped silicon oxide structure. The at least one doped silicon oxide structure has at least one sidewall which is oriented substantially perpendicular to a plane of the semiconductor substrate. At least a portion of the at

least one sidewall of amended independent claim 6 terminates at an interface between the at least one doped silicon dioxide structure and the at least one undoped silicon dioxide structure.

Again, the sidewalls of the windows 66 and 67 of the semiconductor device structure that is described in Cargo extend continuously and uninterruptedly through the entire thickness of the dielectric 61 thereof. As the sidewalls of windows 66 and 67 extend along edge surfaces of the of lower, undoped silicon dioxide section of dielectric 61 of the semiconductor device structure described in Cargo, no portion of any of the sidewalls of window 66 or 67 terminates at an interface between a doped silicon dioxide structure and the lower, undoped silicon dioxide section of dielectric 61.

Moreover, FIGs. 2, 4-6, and 8 of Cargo clearly depict the sidewalls of windows 66 and 67 as being curved, presumably having been formed by isotropic etching processes, and oriented at a variety of nonperpendicular angles relative to the underlying semiconductor substrate. Further, Cargo lacks any express or inherent description that window 66 or 67 may be formed by isotropic etch processes, which would result in sidewalls that are oriented substantially perpendicularly relative to a plane of the underlying substrate 51. Thus, Cargo neither expressly nor inherently describes that a sidewall of window 66 or 67 may be oriented substantially perpendicular to a plane of the substrate 51.

In view of these differences between the subject matter recited in amended independent claim 6 and that described in Cargo, it is respectfully submitted that Cargo does not anticipate each and every element of independent claim 6.

It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(e), amended independent claim 6 recites subject matter which is allowable over that described in Cargo.

Claims 7-13 are each allowable, among other reasons, for depending either directly or indirectly from claim 6, which is allowable.

For these reasons, withdrawal of the 35 U.S.C. § 102(e) rejections of claims 1-13 is respectfully solicited.

ENTRY OF AMENDMENTS

As it is merely proposed that each of claims 1-13 be amended to replace the term “said” with the equivalent term “the,” it is respectfully submitted that the proposed claim amendments do not alter the scope of any of claims 1-13.

In view of the Examiner’s response to the Amendment mailed on August 29, 2003, it is also proposed that independent claims 1 and 6 be amended to recite that at least a portion of a side wall terminate at an interface, clarifying the point of termination. As the revised language does not differ in scope from the original language of independent claims 1 and 6, it is respectfully submitted that the proposed amendments to these claims do not alter the scopes thereof.

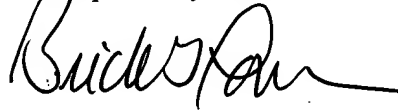
It is also respectfully submitted that the claim amendments that have been proposed herein should be entered as they are fully supported by the as-filed specification, they do not introduce new matter into the above-referenced application, and they will not require another search.

If the proposed claim amendments are not entered, it is respectfully requested that they be entered when a Notice of Appeal is filed in the above-referenced application.

CONCLUSION

It is respectfully submitted that each of claims 1-13 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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